Court of Appeals, Federal Circuit

In re Grasselli and Hardman,
and Rohm and Haas Company, Intervenor

No. 83-504

Decided July 15, 1983

PATENTS

1. Pleading and practice in Patent Office — Rejections (§54.7)

Rejections under 35 USC 103 must be based on evidence comprehended by that section's language.

2. Patentability — Invention — In general (§51.501)

Inherency issue is question of fact.

3. Patentability — Invention — Specific cases — Chemical (§51.5093)

Known relationship of lithium, cesium, rubidium, and francium to sodium and potassium, as Group IA elements, is not sufficient, in and of itself, to treat them as interchangeable in catalyst compositions.

4. Board of Appeals — Procedure after hearing or appeal (§19.40)
Court of Appeals for the Federal Circuit — Jurisdiction (§26.55)

Patent Rule 198 proscriptions, relating to proceedings after Board of Appeals' decision, are not relevant to case remanded to examiner by board under Rule 196(d); under Rule 196(d), board decision including remand is not considered as final decision in case; accordingly, under express provisions of rule, board, after remand proceedings, either adopts its decision as final or renders new decision on all of claims on appeal; express PTO policy interpreting Rule 196(d) suggests that decision containing remand is not appealable under 35 USC 141.

5. Patentability — Evidence of — In general (§51.451)

Objective evidence of nonobviousness must be commensurate in scope with claims that evidence is offered to support.

6. Patentability — Evidence of — In general (§51.451)

Comparison of claimed catalyst with most similar catalyst, which is appellant's, that shows that claimed catalyst outperformed others and conclusion that this is evidence of unexpected superiority is ultimate extension of "indirect showing of unexpected superiority" sanctioned by precedent.

7. Patentability — Anticipation — Combining references (§51.205)

Express descriptions of two references over which claims in issue were rejected that indicates that components of two catalysts are not interchangeable is material to validity of rejection of catalyst composition claims under 35 USC 103.

Particular patents — Catalyst

Grasselli and Hardman, Process for the Manufacture of Isoamylenes and Methyl Butanols and Catalyst therefor, rejection of claims 1-14, 16-18, 33, and 34 affirmed and rejection of claims 15 and 19-32 reversed.

Appeal from Patent and Trademark Office Board of Appeals.

Application for reissue of patent of Robert K. Grasselli and Harley F. Hardman, Serial No. 713,024, filed Aug. 9, 1976, to reissue Patent No. 3,642,930, issued Feb. 15, 1972, on application, Serial No. 867,934, filed Oct. 20, 1969, continuation in part of application, Serial No. 794,469, filed Dec. 30, 1968. From decision rejecting claims 1-34, applicants appeal (Rohm and Haas Company, intervenors). Affirmed in part and reversed in part.

Ford F. Farabow, Jr., Washington, D.C. (David W. Hill and George W.F. Simmons, both of Washington, D.C., of counsel) for appellants.

Dale H. Hoscheit, Washington, D.C., for intervenor

Before Bennett, Smith, and Nies, Circuit Judges.

Nies, Circuit Judge.

This appeal is from the decision of the United States Patent and Trademark Office (PTO) Board of Appeals (board) affirming the final rejections under 35 U.S.C. §103 (1976) of claims 1-34, all of the claims of reissue application serial No. 713,024 filed August 9, 1976. We reverse with respect to claims 15 and 19-32 and affirm the board's decision with respect to all other claims.

I.

The original patent sought to be reissued here, U.S. Patent No. 3,642,930 (issued on

February 15, 1972, to Standard Oil Company, Cleveland, Ohio), is directed to catalysts containing an alkali metal as an essential catalytic ingredient. As claimed, the catalyst composition must contain, in addition to the alkali metal, bismuth, iron and molybdenum in oxide form.[1] Such alkali metal catalyst compositions are asserted, in the patent, to be an improvement over prior art catalysts in that they are particularly suited to the catalytic oxydehydrogenation of isoamylenes, methyl butanols, or mixtures thereof to isoprene.

By this reissue application under 35 U.S.C. §251 (1976), inventors Grasselli and Hardman (hereafter appellants) have presented claims additional to those of the patent: claims directed to catalysts requiring the essential alkali metal component to be potassium, cesium, or rubidium; claims requiring inclusion of preferred additives, and claims requiring activation of the catalyst at 500°F and up to 1250°F.

Specifically, the subject application for reissue sets forth claims to a catalyst composition in claims 6-34, and to a process for catalytic isoprene production in claims 1-5. Claims illustrative of that process and catalyst composition are set forth below:

> 1. The process for the conversion of isoamylenes, methyl butanols or mixture thereof to isoprene comprising contacting said isoamylenes, methyl butanols or mixtures thereof with a molecular oxygen-containing gas over a catalyst consisting essentially of an activated catalytic oxide complex described by the following formula:
>
> $Bi_aFe_bMo_cQ_dR_eT_fM_gO_x$
> wherein Q is an alkali metal,
> R is an alkaline earth metal,
> T is phosphorus, arsenic or antimony,
> M is cobalt and/or nickel, and
> wherein a, b and c are numbers in the range of
> 0.1 to 12, d is a number from 0.1 to 8,
> e is a number from 0 to 8,
> f is a number from 0 to 6,
> g is a number from 0 to 12, and
> x is a number determined by the valence requirements of the other elements present,
>
> in a reaction zone maintained at from above 500°F to about 1100°F. at from about 0.5 to about 10 atmospheres pressure with a contact time of from about 0.01 second to 50 seconds, and recovering the isoprene.
>
> 6. A catalyst composition consisting essentially of an activated catalytic oxide complex of an alkali metal, bismuth, iron and molybdenum as essential catalytic ingredients, and defined by the following formula:
>
> $Bi_aFe_bMo_cQ_dR_eT_fM_gO_x$
> wherein Q is an alkali metal,
> R is an alkaline earth metal,
> T is phosphorus, arsenic or antimony,
> M is cobalt and/or nickel, and
> wherein a, b and c are numbers in the range of 0.1 to 12,
> d is a number from 0.1 to 8,
> e is a number from 0 to 8,
> f is a number from 0 to 6,
> g is a number from 0 to 12, and
> x is a number determined by the valence requirements of the other elements present.
>
> 7. The composition of claim 6 wherein Q is potassium.
>
> 14. The composition of claim 7 wherein M is cobalt and wherein activation of the catalytic oxide complex is conducted at 500°F to 1250°F in the presence of an atmosphere consisting essentially of air.
>
> 15. The composition of claim 6 wherein Q is potassium and M is cobalt, and wherein e equals O, f equals O and g is a number larger than O.
>
> 17. The composition of claim 7 wherein activation of the catalytic oxide complex is conducted at 500°F in the presence of an atmosphere consisting essentially of air.
>
> 19. The composition of claim 6 wherein Q is cesium.
>
> 26. The composition of claim 6 wherein Q is rubidium.

As can be seen from the above, the preferred alkali metals, potassium, cesium, and rubidium, are recited in claims 7, 19 and 26. Claims 14 and 17 recite the temperature at which the catalyst compositions can be activated. Catalyst composition claims, depending from claims 6, 7, 19 and 26, refer to inclusions of optional components expressly recited in claim 6, specifically phosphorus (claims 8, 23 and 30); cobalt (claims 9, 14, 15, 21, 28, 34); nickel (claims 10, 13, 20, 27, 33); mixtures of cobalt and nickel (claim 12); antimony (claims 16, 24, 29) and arsenic (claims 22, 31). Other claims depending from claims 7, 19 and 26 specify that the catalyst is supported on silica (claims 18, 25 and 32).

II.

Notwithstanding its expedited case status, the instant reissue application has been pending for seven years. The many issues, considered in this appeal, are in part attributable to the efforts of Rohm and Haas who vigorously protested this reissue, by appearance during ex parte prosecution, by briefing and oral arguments before the board, and here as an intervenor.[2]

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[1] In the discussion below, this base catalyst is referred to as a four-component catalyst.

These reissue proceedings have twice been appealed to the board. Consequently, two decisions by the board are being reviewed here. As a result of both decisions, there are twelve separate grounds of rejection of the claims, all under 35 U.S.C. §103,[3] which were affirmed by the board and are the subject of this appeal.

During the first appeal, the board affirmed the examiner's final rejections, based on the following four references which disclose alkali metals, or compounds thereof, in catalysis processes.

Japanese Patent Publication No. 41-11847/1966,
June 29, 1966 (Japanese Patent)
U.S. Patent No. 3,205,280 — Wattimena et al. (U.S. Wattimena)
U.S. Patent No. 3,621,072 — Watanabe et al. (Watanabe)
U.S. Patent No. 3,415,886 — McClellan (McClellan)

The Japanese Patent Publication No. 41-11847/1966 (Japanese Patent) was cited as a "new ground" of rejection in the examiner's answer in the first appeal to the board as a result of five affidavits, filed by Rohm and Haas, apparently purporting to show that Example 4 of the Japanese Patent produced a product within appellants' claims.

The examiner did not make the additional rejections based on other prior art references as suggested by Rohm and Haas.

However, in the board's first decision, pursuant to its authority under 37 C.F.R. §§1.196(b) and 1.196(d) (Rules 196(b) and 196(d)),[4] the board did entertain Rohm and Haas's suggestions to make those additional rejections on the following references:

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[2] The Rohm and Haas motion to intervene here was granted in view of Rohm and Haas's status as a protestor in these reissue proceedings and because the catalyst that Rohm and Haas uses for the oxidation of propylene to acrolein (a catalytic oxidation of an olefin to an unsaturated aldehyde) was accused in an International Trade Commission ("ITC") proceeding of infringing the Grasselli and Hardman catalyst claims. See Rohm & Haas v. ITC, 554 F.2d 462, 193 USPQ 693 (CCPA 1977). The ITC proceedings were terminated at Standard Oil's behest prior to a determination on the merits, following which Standard Oil sought reissue.

[3] §103 provides:

§103. Conditions for patentability; non-obvious subject matter

— A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

[4] §1.196(b) provides:

(b) Should the Board of Appeals have knowledge of any grounds not involved in the appeal for rejecting any appealed claim, it may include in the decision a statement to that effect with its reasons for so holding, which statement shall constitute a rejection of the claims. The appellant may submit an appropriate amendment of the claims so rejected or a showing of facts, or both, and have the matter reconsidered by the primary examiner. The statement shall be binding upon the primary examiner unless an amendment or showing of facts not previously of record be made which, in the opinion of the primary examiner, avoids the additional ground for rejection stated in the decision. The appellant may waive such reconsideration before the primary examiner and have the case reconsidered by the Board of Appeals upon the same record before them. Where request for such reconsideration is made the Board of Appeals shall, if necessary, render a new decision which shall include all grounds upon which a patent is refused. The appellant may waive reconsideration by the Board of Appeals and treat the decision, including the added grounds for rejection given by the Board of Appeals, as a final decision in the case.

§1.196(d) provides:

(d) Although the Board of Appeals normally will confine its decision to a review of rejections made by the primary examiner, should it have knowledge of any grounds for rejecting any allowed claim that it believes should be considered, it may include in its decision a statement to that effect and remand the case to the primary examiner for consideration thereof. In such event, the Board shall set a period, not less than one month, within which the appellant may submit to the primary examiner an appropriate amendment, or a showing of acts or reasons, or both, in order to avoid the grounds set forth in the statement of the Board of Appeals. If the primary examiner rejects the previously allowed claim or claims on the basis of such statement, the appellant may appeal to the Board of Appeals from the rejection. Whenever a decision of the Board of Appeals includes a remand, that decision shall not be considered as a final decision in the case, but the Board of Appeals shall, upon conclusion of the proceedings before the primary examiner on remand, either adopt its decision as final or render a new decision on all of the claims on appeal, as it may deem appropriate.

U.S. Patent No. 3,226,442 — Sennewald et al.
U.S. Patent No. 3,346,617 — Hiroki et al.
U.S. Patent No. 3,414.631 — Grasselli et al. (Grasselli '631)
U.S. Patent No. 3,454,630 — Yamaguchi et al.
British Patent 973,565 — Wattimena et al. (British Patent)

Specifically, the board's first decision contained a recommendation to the examiner, in accordance with Rule 196(d), to reconsider the examiner's allowance of certain claims in view of the above references. After remand of the case to the examiner, and during prosecution before him, various declarations and affidavits were presented by both Rohm and Haas and appellants. Relying on 37 C.F.R. §1.198,[5] the examiner refused to consider appellants' declarations and affidavits, after having specifically been entered by petition to the Commissioner, on the ground that the experiments therein related only to rejections affirmed by the board in its first decision.

Since the board's second decision is expressly limited to consideration of the rejections originally proposed by the board under Rules 196(b) and 196(d), the board apparently adopted, at least in part, the examiner's reasoning for refusing to consider appellants' affidavits and declarations filed during the remand period.

As a result of the subsequent prosecution and the board's second decision, all of appellants' claims (original as well as new claims) stand rejected under 35 U.S.C. §103. Specifically, the following grounds apply:

Claims	References
1-7,11, 19, 25, 26, 32	U.S. Wattimena
11, 16, 19, 23-26, 29, 30, 32	Watanabe
1-15, 18-21, 23, 25-28 30, 32-34	McClellan
6, 7, 11-15, 18-21, 25-28, 32-34	Japanese Patent
12-15, 18, 20, 21, 27, 28, 33, 34	U.S. Wattimena taken with the British Patent
16, 24, 29	McClellan taken with Grasselli '631
16, 24, 29	Japanese Patent
6-8, 11, 16, 19, 23-26, 29, 30, 32	Sennewald et al. in combination with Hiroki et al.
5, 9-13, 15-16, 18-34	Yamaguchi et al., or Grasselli '631 taken with Watanabe
17, 22, 31	Sennewald et al. in combination with Hiroki et al.
22, 31	Grasselli '631 in view of Watanabe and appellants' admissions
17, 22, 31	McClellan in view of Grasselli '631

III.

To set the context of the issues here, it is emphasized that all rejections made by the PTO are under 35 U.S.C. §103. No written description of a catalyst embraced by the appealed claims appears in the prior art applied in the various rejections. In re Marshall, 578 F.2d 301, 198 USPQ 344 (CCPA 1978); In re Arkley, 455 F.2d 586, 172 USPQ 524 (CCPA 1972). However, Rohm and Haas put forth a theory of inherency, normally the basis for rejection under 35 U.S.C. §102, that the board apparently adopted.

In any event, the issues here relate to the determination of obviousness, or nonobviousness, of claims directed to a catalyst composition with four essential components: bismuth, iron, molybdenum and an alkali metal, as well as to claims of a method using that catalyst.

Appellants take the position that none of the rejected claims would have been prima facie obvious from the prior art. In essence, appellants argue that catalysis is unpredictable and that the board has equated very different catalysts and very different reactions with those of appellants to support the rejections.

Alternatively, if the claims appear to have been prima facie obvious, appellants argue that rebuttal evidence of record negates this conclusion. Primarily, appellants rely on Friedrich I, Friedrich II, Friedrich III and Friedrich IV declarations, although other declarations (and affidavits) were filed on behalf of appellants corroborating, supporting, or adding to information set forth in the four Friedrich declarations.[6] Specifically, appellants ask this court to consider, although the board did not, the experiments and evidence of Friedrich III and IV with respect to rejections affirmed by the board in its first decision.

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[5] §1.198 provides:

> Cases which have been decided by the Board of Appeals will not be reopened or reconsidered by the primary examiner except under the provisions of §1.196 without the written authority of the Commissioner, and then only for the consideration of matters not already adjudicated, sufficient cause being shown.

[6] These are by Baldwin, Strecker, Callahan and Grasselli et al. Rohm and Haas, too, has filed various declarations and affidavits. These are by Kennelly, De Jong, Lade, Bauer and Nemec.

IV.

The examiner held that appellants' claimed catalyst and method of use would have been obvious on the basis of teachings in any one of the following references: Japanese Patent; U.S. Wattimena, Watanabe, or McClellan. These four references were asserted as four separate grounds of rejection which were the subject of the first appeal. As the PTO treated these four references as the references most material to the issue of patentability of all of the rejected claims, they will be considered first; for analysis, we find it convenient to discuss them starting with Watanabe.

A.

Watanabe (U.S. Patent No. 3,621,072)

Appellants argue, and we agree, that the board erred in holding that any of appellants' claims would have been obvious from the teachings of Watanabe.[7]

Watanabe describes a catalytic conversion of a mixed gas of isobutylene, methanol and/or ethyl ether to isoprene. The catalyst used by Watanabe is described to be at least one oxide of tungsten, vanadium, molybdenum, uranium, copper, iron, and chromium. Various Watanabe examples employ as the catalyst one oxide of the aforementioned elements; one of the examples employs as a catalyst a mixed oxide system of molybdenum-vanadium-uranium-tungsten.

In the board's view Watanabe is pertinent under 35 U.S.C. §103 for the sole reason that:

> We note the explicit *suggestion* by these patentees *to add* compounds of *alkali metals such as sodium or potassium* to the catalysts, to increase isoprene selectivity. [Emphasis added.]

Watanabe describes the addition of promoters to the catalyst, to inhibit side reactions and increase product selectivity. These promoters are described to be compounds of phosphorus, sulfur, boron, antimony, bismuth, tellurium, silver, barium, calcium, magnesium, potassium and sodium. Of the 22 Watanabe examples, 10 describe the use of promoters. None of the specific examples relies on the use of sodium or potassium as a promoter.

The "promoted catalysts" actually described therein — oxides of the following systems: uranium-antimony; tungsten-tellurium; molybdenum-phosphorus; molybdenum-sulfur; vanadium-sulfur; molybdenum-bismuth-phosphorus and calcium-bismuth-molybdenum-phosphorus — differ significantly from the subject compositions. Even if sodium or potassium were substituted, in any one of the exemplified "promoted" catalysts, for the identified promoter(s), and were operative therein, any composition thus created is deficient in at least one element of appellants' catalyst and there is no objective basis to add the missing element(s) to create the composition as claimed. Thus, appellants' catalyst composition cannot be held to have been obvious from Watanabe alone.

B

Wattimena (U.S. Patent No. 3,205,280)

U.S. Wattimena describes butene production by dehydrogenating butane in the presence of a halogen, oxygen and a solid catalyst.[8]

According to U.S. Wattimena, the solid catalyst must contain "one or more alkali metal and/or alkaline-earth metal compounds"; and the preferred catalysts are reported to be those composed of potassium bromide, silver bromide and didymium chloride, on a support. U.S. Wattimena broadly suggests enhanced activity of the basic catalyst on "addition" of "one or more metal compounds derived from the transition elements of Groups I and IV to VIII of the Periodic Table and/or a rare-earth metal compound," such as the elements: zirconium, titanium, vanadium, chromium, molybdenum, manganese, tungsten, iron, cobalt, nickel, palladium, copper, silver and compounds thereof.

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[7] Although appellants had argued in the first appeal, and do here, that Watanabe "falls short of establishing a prima facie case or obviousness," appellants filed a declaration under 37 C.F.R. §1.131 "in order to simplify the issues on appeal," during the remand period between the first and second appeals to the board. In the board's second decision, the board reversed the rejections of certain claims over Watanabe, finding the declaration sufficient to antedate the reference with respect to those claims. As the Watanabe reference does not establish a prima facie case of obviousness, we need not treat the remaining issues arising under 37 C.F.R. §1.131.

[8] Although it appears from the discussion above, in section II, that U.S. Wattimena and the British Patent (British Patent No. 973,565 to Wattimena) are used in two different grounds of rejection, this is not the case. The examiner and the board treated the British Patent to be cumulative to U.S. Wattimena. For purposes here, we will agree with the examiner and the board, in a way as adverse to appellants as possible, that the British Patent confirms the intention of U.S. Wattimena to disclose bismuth as a potential catalytic component.

The rejections under 35 U.S.C. §103 over Wattimena are based on the following description:

> A suitable *solid catalyst (plus carrier)* for the dehydrogenation of butene to butadiene has the following composition (in parts by weight): $A1_20_3$ 90.2; $Si0_2$ 9.0; Fe_20_3 0.2; Mg0 0.1, Ca0 0.1; Na_20 0.1; K_20 0.1; and $Ti0_2$ 0.1. A catalyst which was successfully used in the dehydrogenation of n-butane contained, in addition, 1.7 "didymium oxide." 0.6 Na_20, and 1.4 $Mo0_3$, the latter compounds as Na-molybdate. In another similar case, the additional compounds consisted of 11.4 Bi_20_3 and 7.0 $Mo0_3$ parts by weight. Excellent results were also obtained with a solid catalyst consisting of 100 $Si0_2$; 19.9 "didymium oxide"; 17.1 $Mo0_2$ and 3.7 Na_20 parts by weight.

U.S. Wattimena, col. 4, lines 38-49 (emphasis added).

As framed by the parties, the issue posed by Wattimena resides in an *interpretation* of the description of the first composition of eight components ($A1_2O_3$, SiO_2, Fe_2O_3, MgO, CaO, Na_2O, K_2O and TiO_2), particularly in light of the language "solid catalyst (plus carrier)." Two extremely divergent views in interpreting this description have been argued.

On the one hand, it is argued that appellants' catalyst, for example as in claim 6, would have been obvious from the whole of the above excerpt from Wattimena inasmuch as the four components of appellants' catalyst would be found together if Bi_20_3 and $Mo0_3$ are added as suggested in the third sentence of the above excerpt, (albeit as a ten-component composition);[9] however, it is noted, the excerpt fails as a direct anticipation because, inter alia, the eight-component composition contains $Ti0_2$, described as a catalytic component by U.S. Wattimena but not recited in appellants' claims as a catalytic component.

On the other hand, appellants argue that the eight-component composition described in the excerpt above must be construed as constituting a *carrier*. To buttress this argument, appellants rely on information in brochures, as well as other evidence in the record of this appeal, which shows that Norton alpha aluminas (catalyst carriers) comprise each of the eight components ($A1_20_3$, $Si0_2$, Fe_20_3, Mg0, Ca0, Na_20, K_20 and $Ti0_2$) in substantially similar, though not identical, proportions to the eight-component composition in the Wattimena description excerpted above and relied upon by the PTO in the rejections under 35 U.S.C. §103[10]

In our view, the effect of this information concerning the composition of the Norton alpha-alumina carrier is not to interpret what was intended by Wattimena's description, but to shift the burden of going forward to the PTO. It then became incumbent on the PTO to show that Wattimena itself would suggest adding two components and selecting out at least the four essential components of appellants' catalyst, or that there was some reasonable basis in the prior art to make the selection claimed here. See In re Sasse, 629 F.2d 675, 681, 207 USPQ 107, 111-12 (CCPA 1980). The PTO failed to counter appellants' showing and, accordingly, we do not sustain claim rejections based on U.S. Wattimena.

C.

The Japanese Patent Publication 41-11847 (Japanese Patent)

The Japanese Patent is directed to improving the selectivity of a known process for producing propylene oxide (the epoxide) by decreasing isomerization reactions which result in the by-product propionaldehyde. This improvement is achieved by modification of process conditions but does not rely on use of any particular catalyst system.

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[9] Declarations filed by Friedrich (Friedrich I) and Strecker on appellants' behalf have been considered. These declarations attempt to show that the written description fails to produce appellants' catalyst and pertains to X-ray study comparisons of the eight-component composition, described in Wattimena, excerpted above, and of the composition resulting from the addition of Bi_20_3 and MoO_3 to that eight-component composition. These declarations are not considered to be dispositive of the issue attempted to be proven, as there is, inter alia, no X-ray study of a four-component catalyst, of, for example, appealed claim 6, in the study.

[10] The evidence, brochures and other information, includes an April 4, 1977, letter from James D. Ball of Norton Company Chemical Process Products Division; a typical chemical analysis of the SA-5105 (SA-105) catalyst carrier, a Norton alpha-alumina; Bulletin CC-10 entitled "Catalyst Carrier," (1974); a chemical analysis sheet for SA-5205, augmenting information in Bulletin CC-10; and a comparison of the old product, the then current (1977) product and the product sent to Standard Oil Company.

The Baldwin declaration confirms the fact that Norton alpha aluminas (for example, Norton SA 105) predate the application filing date of the original patent sought to be reissued; none of the arguments here dispute that fact.

In fact, the Japanese Patent suggests no criticality as to the catalyst composition: That is, the Japanese Patent indicates that any "metal and/or metallic oxide system" based on "copper, silver, molybdenum, bismuth, vanadium, antimony, tungsten, cobalt, nickel, manganese, chromium, tin, selenium, or iron" may constitute the catalyst. Catalysts used in Examples 1-3 and 5-12 vary widely in composition, for example, from silver or silver oxide alone to systems including copper, tin, and selenium.

The contribution of the Japanese Patent, the modification of the propylene oxide production process conditions to improve selectivity, requires both *inclusion of a peroxide* or a peroxide source in the feed stream of propylene and oxygen *and* addition of a *basic organic or inorganic substance* (hereinafter "basic modifier") to an "ordinary" oxidation catalyst of a metal and/or metallic oxide system. The basic modifier is broadly described as organic or inorganic, solid or liquid, either a strong base or a weak base. In the examples, triethanol amine, 2,3,4-trimethyl pyridine, sodium carbonate, sodium hydroxide and potassium hydroxide are used as the source of the basic modifier.[11]

Within the confines of the patent, a number of examples of the improved process are given. But for Example 4, the entire disclosure is otherwise of no interest.

In Example 4, the first stage in the process requires admixing potassium hydroxide (as the source of the modifier) with stearic acid containing a calcined mixture of the salts of bismuth, iron and molybdenum. The pertinent portion of Example 4 reads:

Example 4:

> 110 gm of ammonium molybdate was dissolved in 150 cc of hot water. Separately a dispersion of 150 gm of bismuth nitrate and 50 gm of ferric nitrate in 100 cc of 1N nitric acid solution was prepared. The solutions were mixed to form a milky brown precipitate. The precipitate was dried at 110°C, crushed, 1% by weight of stearic acid added and molded to circular tablets 5 mm diameter x 5 mm, then calcined at 400°C for 16 hours. The catalyst thus obtained is referred [to] as Catalyst-C (comparative example).
>
> 15 cc of 1N potassium hydroxide solution was added to the Catalyst C and the product obtained by drying it at 120°C is referred [to] as Catalyst D (example of this invention).

It is apparent that no written description of the claimed compositions is given in Japanese Patent Example 4 and the board refused to hold the Japanese Patent to be a direct anticipation. In re Arkley, 455 F.2d 586, 172 USPQ 524 (CCPA 1972). Without explanatory comment, the board, nevertheless, adopted the examiner's reasons for affirmance of the §103 rejections based *not* on any interpretation of the *prior art* embodied by the Japanese Patent, but on extraneous evidence in the form of affidavits filed by Rohm and Haas during the examination of the subject reissue application in support of its assertion that appellants' catalyst was anticipated by Japanese Patent Example 4, a position it urged before the board.

[1] It is fundamental that rejections under 35 U.S.C. §103 must be based on evidence comprehended by the language of that section. In re McKellin, 529 F.2d 1324, 1329, 188 USPQ 428, 433 (CCPA 1976). We consider the affidavits not because of their competency as prior art but rather because of the *inferences of inherency* which underlie the PTO's §103 rejections based on the Japanese Patent and which are not consistent with the description of the Japanese Patent, set forth above. If the affidavits fail to show that Japanese Patent Example 4 produces a composition within the rejected claims, a fortiori, they evidence nothing relevant to the patentability of the rejected claims.

Inherency would be established either if the portion of Example 4 excerpted above produces the four-component catalyst; or if the Example 4 catalyst is converted to the four-component catalyst when it is subjected to temperatures of propylene oxide production described in other portions of Example 4.

[2] The issue of inherency is a question of fact. In re Fracalossi, 681 F.2d 792, 794, 215 USPQ 569, 571 (CCPA 1982). Five affidavits, apparently presented by Rohm and Haas to support the above two arguments, fail to establish such critical facts. The affidavits state that a reaction product is formed (by a test with pH paper) when the potassium hydroxide is added to the stearic acid containing the calcined mixture of salts of bismuth, iron, and molybdenum when the synthesis of Japanese Patent Example 4 is followed, and that the potassium content of that reaction product remains substantially constant, whether it is merely dried at 120°F or subsequently heated at 340°C, or heated to 427°C, and then to 538°C. However, there is no evidence that that reaction product is one embraced by claims 6 and 7. Specifically,

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[11] Significantly, the Japanese Patent does not describe "alkali metal(s)" either in conjunction with the description of the catalyst or in conjunction with the basic modifier.

there is no evidence of record which shows that that reaction product includes potassium in the potassium oxide form.[12] If appellant's catalyst is inherent in the Japanese Patent, it has not been established by the record here and obviousness cannot be predicated on that which is unknown. Thus, we reverse the board's rejection on the Japanese Patent.

D.

McClellan, U.S. Patent No. 3,415,886

McClellan, U.S. Patent No. 3,415,886, is directed to bismuth molybdate-, or phosphobismuth molybdate- (bismuth molybdate), on silica catalysts heat treated to temperatures of 750° to 850°C to convert crystalline bismuth molybdate to an amorphous phase. Heat treatment to achieve this result may be undertaken in two stages, first at a temperature of 400 to 500°C and then at a temperature of 750 to 850°C. These catalysts are described to be useful in oxydative dehydrogenation, in propylene ammoxidation and isoprene production.

The significance of McClellan resides in its additional descriptions, relating to the presence of alkali metal in the catalyst and to the enhancement of catalytic activity by inclusion of promoters such as iron. Appellants argue, however, that McClellan actually teaches away from inclusion of alkali metal in the catalyst and, that as to promoters, McClellan contains merely a "shot-gun" description of many elements for such use, which would not lead a person of ordinary skill to select the elements appellants require.

With respect to alkali metal inclusion, McClellan suggests that sodium and/or potassium may *contaminate* the McClellan heat treated catalyst if reactants containing sodium or potassium are employed, as a source of the molybdate, or if the silica sol used as the essential silica carrier contains either or both:

> Molybdenum oxide is usually obtained from aqueous ammonium molybdate; however, alkali molybdates can be used. When alkali molybdates such as sodium or potassium molybdate are used, sodium or potassium ion, which is difficult to eliminate completely, must be acceptable in the final catalyst. An atomic Na:Mo ratio of 1:4 must not be exceeded in order to maintain good directivity in the catalyst. After processing in the manner described in this invention, heat-treated compositions containing sodium or other alkali or alkaline earth metals in the acceptable metal/molybdenum ratio of 1:4 or less give X-ray evidence of the presence of the scheelite structure of crystalline $Mx_1/xBiMo_2O_8$, where x = valence of alkaline earth or alkali metal M. In view of the desirability of low sodium and potassium content in most catalysts, ammonium molybdate is a preferred source of the molybdenum component of the catalyst.
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> The catalyst of the invention involves use of silica as a support, and the silica must be added as colloidal silica, i.e., an aqueous silica sol (silica sols generally contain about 30-40% silica). The silica can be present in the final catalyst in any amount less than 90% and greater than 5%, but it is preferred that the catalyst contain about 27-75% by weight of silica. Certain commercial silica sols contain small amounts of sodium (e.g., one commercially available product of 30% SiO_2 content contains 0.3% Na_2O as titratable alkali), but, as previously discussed, low levels of sodium appear to have no serious effect on the catalysts of this invention. When these commercial silica sols are used, the catalytic composition can have the following formula.
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> $Bi_a\,P_b\,Mo_{12}\,Si_c\,O_dNa_e$ where a is 4, b is 0 to 2, c is 24 to 160, d is 1.5a + 2.5b + 36 + 2c + 0.5e and e is 0 to 3.

McClellan, col. 3, lines 1-65.

Although McClellan does indicate that sodium and/or potassium can adversely affect the "directivity" of catalysts, as well as methods for insuring the absence of alkali metal, McClellan's catalyst will tolerate sodium and/or potassium contamination to a specified extent. Moreover, Example 1 of the reference describes, as a result of McClellan's heat treatment (at 750°C), an amorphous scheelite $NaBiMo_2O_8$ catalyst.[13] McClellan describes sodium or potassium in a bismuth molybdate catalyst and the efficacy of the resulting composition for its intended use as a catalyst. The only missing ingredient is iron which, however, McClellan supplies.

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[12] Moreover, the evidence in Friedrich II and Friedrich III comparing the catalyst of the Japanese Patent Example 4 to appellants' four-component catalyst, containing potassium as the essential alkali metal, shows that under certain catalytic reaction conditions the activity of appellants' four-component catalyst differs substantially from that produced by the Japanese Patent Example 4 and that activity is independent of amounts of potassium hydroxide used.

[13] Appellants argue that the language "activated catalytic oxide complex" in claims 1 and 6 and the language in claims 17 and 14 specifying temperatures of 500°F and 500 to 1250°F, respectively, as temperature of catalyst activation, serve as patentable distinction over McClellan which requires an ultimate calcination temperature of 750°-850°C. However, McClellan does indicate that the first

catalyst and the efficacy of the resulting composition for its intended use as a catalyst. The only missing ingredient is iron which, however, McClellan supplies.

To enhance catalytic activity, McClellan enumerates iron, nickel, or cobalt, as well as various other elements, as promoters. Appellants argue that many elements are enumerated as promoters and that no specific promoted *catalyst* is described in McClellan. However, McClellan specifically indicates that addition of the promoters, iron, for example, (as well as "cobalt and nickel," recited in other claims) will enhance catalytic activity. Moreover, McClellan specifically describes how to apply these promoters:

> These promoters are usually applied by impregnation or surface coating of already formed bismuth molybdate of phosphomolybdate-on-silica catalysts. Thus, the metals can be added to the slurried catalyst as a salt or acid or the metal, e.g., as a compound which is thermally decomposable in situ to form the desired promoter. After the catalyst has been impregnated with such solutions, employed in concentrations adequate to provide the desired amount of material, the impregnated catalyst may be dried and calcined *at any desired temperature.*

McClellan, col. 5, lines 2-11 (emphasis added).

The descriptions of McClellan directed to adding iron, nickel and cobalt as promoters, how to make that addition, and the effect of that addition, once made, suggest a predictably operative result, a successful addition to those elements to McClellan's catalyst. In re Mercier, 515 F.2d 1161, 185 USPQ 774 (CCPA 1975).

In view of the McClellan description concerning the addition of *iron* as a promoter and the express statement concerning the tolerance of McClellan catalysts to limited amounts of sodium and potassium ion, we agree with the board that appellants' claimed catalyst composition of these four elements and claimed method would have been prima facie obvious from McClellan and in the absence of evidence to overcome this prima facie case the rejections of claims 1-15, 18, 33 and 34 must be affirmed.

However, we do not agree that McClellan also renders obvious appellants' catalysts containing cesium or rubidium as the essential alkali metal (appealed claims 19 and 26, and claims depending therefrom). Without express comment, the board apparently tacitly adopted the examiner's reasons for rejection:

> [N]o *patentable distinction* was seen *in the claimed use of* cesium or rubidium rather than the sodium or potassium components taught by the patent. [Emphasis added.]

The reference to "patentable distinction," begs the inquiry under 35 U.S.C. §103. Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966).

[3] The only possible basis for rejecting appellants' catalyst composition claims requiring cesium or rubidium, not expressly described in McClellan, is the implicit assumption that the McClellan language "alkali metal" makes all elements of Group IA of the Periodic Table, lithium, sodium, potassium, rubidium, cesium and francium, equivalents for *modifying* bismuth molybdate *catalysts.* However, the known relationship of lithium, cesium, rubidium and francium to sodium and potassium, as Group IA elements, is not sufficient, in and of itself, to treat them as *interchangeable* in *catalyst* compositions. In re Doumani, 281 F.2d 215, 217, 126 USPQ 408, 410 (CCPA 1960).

Moreover, there is no description in McClellan which suggests the equivalency inferred by the PTO. The language "alkali metal" as used in McClellan relates to practical sources of contamination of the bismuth molybdate catalyst, by sodium or potassium salts of the *molybdate source* or by sodium in the carrier. In view of the lack of description in McClellan, or in any other art or record here, of cesium and/or rubidium reactants or catalytic components, McClellan's caveat concerning the effect of alkali metal contamination of catalysts, and the express limit on the amount of alkali metal tolerated by McClellan heat-treated catalysts, we conclude that the efficacy of the cesium- and rubidium-containing compositions as catalysts in claims 19-32 could only be derived from scrutiny of appellants' specification. Accordingly, the rejections of claims 19-21, 23, 25-28, and 30 are reversed.

V.

Turning to the issue of whether appellants have overcome the prima facie case of obvi-

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stage of a two-stage calcination treatment may be undertaken at lower temperatures, 400° to 500°C, which can produce a catalyst, though a conventional one, and not McClellan's amorphous catalyst resulting from higher heat treatment, i.e., 750° to 850°C. McClellan does not state that sodium or potassium contamination of bismuth molybdate will not occur at 400-500°C.

ousness of claims 1-15, 18, 33 and 34 based on McClellan, we are faced with the question of what evidence must be considered. Appellants ask this court to consider all evidence in Friedrick I, II, III, and IV, as well as all other affidavit and declaration evidence of record. Appellants assert that the board erred in refusing to consider Friedrich III with respect to rejections based on McClellan alone. Friedrich III and Friedrich IV present rebuttal evidence relating to McClellan, as well as information and experiments responding to the board's criticisms of Friedrich II experiments relating to the Japanese patent.

Friedrich III and Friedrich IV, filed during the remand period after the first board decision, in which the rejections based on McClellan alone were affirmed, but before the second appeal, were ultimately entered as evidence by the Commissioner on equitable grounds, although the Commissioner acknowledged the examiner's reasons for refusing to enter the declarations; evidence therein related only to rejections already affirmed by the board in the first decisions.[14]
The examiner refused to consider the rebuttal evidence in Friedrich III and IV as it pertained to the rejections which were the subject of the first appeal, even after entry of the two declarations by the Commissioner, for the following reason:

> Rule 198, however, does not authorize the Primary Examiner to consider matters already adjudicated, which Friedrich III [sic] declaration clearly attempts to force.

The board apparently adopted the examiner's reason without comment and expressly limited its second decision to consideration of the new rejections.

[4] Rule 198 proscriptions, relating to proceedings after the board's decision, are not relevant to a case remanded, as here, to the examiner by the board under Rule 196(d). Under rule 196(d), a board decision including a remand is "not * * * considered as a final decision in the case." Accordingly, under the express provisions of the rule, the board, after the remand proceedings, "shall * * * either adopt its decision as final *or* render a new decision on all of the claims on appeal." (Emphasis added.) Express PTO policy interpreting Rule 196(d) suggests that the decision containing the remand is not appealable under 35 U.S.C. §141. Manual of Patent Examining Procedure, §1213.04 (Oct. 8, 1981). Thus, it was error to apply Rule 198 in this instance.

All evidence presented by appellants should have been considered in connection with all rejections, and in view of the inordinate delays in these proceedings, we will proceed to do so.

Of most significance is the evidence in Friedrich III. By Friedrich III appellants sought to establish that appellants' four-component catalyst unexpectedly outperforms the composition of McClellan's Example 1 (modified to contain iron as a promoter). The experiment was made on the basis of appellant's catalyst containing sodium as the essential alkali metal component and activated at a temperature between 500° and 1250°F, in ammoxidation after 20 hours on stream to make acrylonitrile.

Initially, it is noted that appellants' process claims 1-5 are directed to isoprene production. Thus, the above comparison "in ammoxidation" is of no help with respect to overcoming the rejections of claims 1-5 and appellants do not so assert.

[5] It is well settled "that objective evidence or non-obviousness must be commensurate in scope with the claims which the evidence is offered to support." In re Tiffin, 448 F.2d 791, 171 USPQ 294 (CCPA 1971). With respect to appellants' broad claims to a catalyst with "an alkali metal," the experiments detailed in Friedrich III, being limited to sodium only, are not commensurate in scope, and are, therefore, insufficient to rebut the prima facie case. No claim is directed to sodium as the essential alkali metal compo-

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[14] In granting appellants' petition from the examiner's refusal to enter Friedrich III and IV declarations, the Commissioner stated:

> [1] It would be inequitable to deny applicants, who are the real parties of interest, as much right to participation and evidentiary showings [in Friedrich III and Friedrich IV] in their own reissue application as has already been accorded on the record to Protestor [by de facto entry and consideration of Rohm's declaration by Nemec, criticizing Friedrich III].
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> [2] It is noted that applicants, by virtue of filing a continuation reissue application, could formally introduce said declarations into the record, but with concommitant delays in ultimate resolution of the issues. It does not appear that such delay would serve any useful purpose. Furthermore, reference is again made to the already lengthy prosecution history of the instant case and the deferral of enforcement of the original patent as noted in Paper No. 89. Therefore, in view of the equities involved and in order to expedite the resolution of the issues in this case .... *The Primary Examiner is hereby directed to proceed* with dispatch as indicated in Paper No. 89 with the examination of the instant case including considering the Friedrich III and IV affidavits for their probative value and merit. [Emphasis added.]

nent.[15] Accordingly, the rejections based on McClellan alone have not been overcome notwithstanding the evidence in Friedrich III.

However, the evidence in Table II of Friedrich II, rebuts any case of prima facie obviousness of claim 15. Claim 15 defines appellants' catalyst to be a composition of potassium, iron, bismuth, molybdenum, and cobalt. In Table II of Friedrich II, appellants have shown that a catalyst of claim 15 results in a percentage improvement (in yield) of 94% over their own catalyst of claims 6 and 7, containing potassium, iron, bismuth, and molybdenum (exclusive of cobalt) in acrolein production at 400°C, while at 310°C, the percentage improvement is even greater, 479%. In evaluating this evidence, we have noted that actual acrolein yields increase with increasing temperature.

[6] None of the prior art reviewed here, including McClellan, describes a catalyst more similar to that of claim 15 than those described in appellants' claims 6 or 7. Accordingly, that comparison in Table II of Friedrich II which shows that the claim 15 catalyst outperformed the others (i.e., claims 6 and 7) is evidence of unexpected superiority. This comparison, and the conclusion based thereon, is the ultimate extension of the "indirect showing of unexpected superiority" sanctioned by precedent. In re Fenn, 208 USPQ 470, 473 (CCPA 1981); In re Fouche, 439 F.2d 1237, 1241-42, 169 USPQ 429, 433 (CCPA 1971). Accordingly, the rejection of claim 15 based on McClellan is reversed.

VI.

The remainder of the rejections are those instituted by the board, pursuant to Rules 196(b) and 196(d). The grounds of rejections in the claim rejections are based on combinations of references. The grounds for the section 103 rejections under Rule 196(b) and 196(d) will be considered below, not necessarily in an order relating to the significance of the art to the rejected claims, but rather with respect to the number of claims affected thereby.

A.

Rejections Under 35 U.S.C. §103 Over Hiroki and Sennewald

The examiner refused to entertain the Rohm and Haas suggestion to reject claims over the combination of Sennewald (U.S. Patent No. 3,226,442) and Hiroki (U.S. Patent No. 3,346,617), stating:

> [S]uch a rejection would not be valid because there is insufficient basis for combining the Sennewald and Hiroki patents in the manner suggested.

However, in the board's first decision, the board added rejections of claims 6-8, 11, 16, 19, 23-26, 29, 30, and 32, over that combination and recommended similar rejections of allowed claims 17, 22, and 31. The board reasoned:

> We must disagree with the Examiner's view that these references are not properly combinable, because both are directed to catalytic compositions utilized in the production of methacrylonitrile from isobutylene.

[7] The utility of the two different catalysts of the Sennewald and Hiroki references might suggest, as the board purported, interchangeability of the catalysts. However, the express descriptions of those references which indicate that components of the two catalysts are not interchangeable is material to the validity of the rejection of catalyst composition claims under 35 U.S.C. §103.

In the board's limited discussion of this ground of rejection, the board concerned itself mainly with Hiroki without commenting on Sennewald, save for the Sennewald description of utility. Hiroki is directed to modifying a bismuth phosphomolybdate catalyst to improve the yields in ammoxidation processes by increasing the alkalinity of the bismuth phospho-molybdate catalyst. In the express words of Hiroki:

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[15] We have considered, and dismiss, intervenor's criticisms of the reproduction of the McClellan catalyst in Friedrich III. The ultimate unsupportable extension of the Rohm and Haas position is that appellants should modify McClellan descriptions to make a "composite" which is appellants' invention. See discussion in In re Tiffin, 443 F.2d 394, 399-400, 170 USPQ 88, 93 (CCPA 1971), *modified* (as to claims 1-3 and 10-16) 448 F.2d 791, 171 USPQ 294 (CCPA 1971). Firstly, it was argued that the McClellan promoter should have been added prior to McClellan's critical calcination stage undertaken at 750° to 850°C. However, McClellan describes (in the generic teaching and in Example 1) undertaking catalyst calcination in two stages, the last stage at 750-850°C; and then describes calcination of the catalyst impregnated with promoter "at *any* desired temperature" (emphasis added). Accordingly, McClellan suggests three calcination stages. The lack of criticality in McClellan's own description of the temperature of the calcination of catalyst impregnated with promoter can hardly be construed to require a temperature of 750-850°C. Secondly, appellants are criticized for comparison of the two catalysts in ammoxidation; since McClellan expressly discloses use of McClellan catalysts in ammoxidation, an ammoxidation process is a reasonable reaction choice for comparative catalytic activity studies as to catalyst composition claims. Thirdly, intervenor criticizes the comparisons on the grounds that the compared catalysts selectivities are similar. This criticism would only have validity if the catalyst activity and resultant yields were similar, which is not the case here.

> [The bismuth phospho-molybdate catalyst] is made "more alkaline," either by the addition to the bismuth phospho-molybdate catalyst of an alkali metal or alkaline earth metal, or by the substitution of arsenic and/or antimony for a part or all of phosphorous in the phospho-molybdate composition, or further by the addition to the substantial molybdate of an oxide or hydroxide of an alkali or alkaline earth metal.

Hiroki, col. 2, lines 13–20.

Specifically, Hiroki suggests three, apparently equivalent, ways to increase the alkalinity of bismuth phospho-molybdate catalysts. The board treated those three ways of rendering the phospho-molybdate "more alkaline," as equivalent in making the rejection. This is not error as we find no description in Hiroki to indicate otherwise.

Hiroki was applied in the rejection for its suggestion to add alkali metal to a bismuth phospho-molybdate catalyst. Sennewald, silent with respect to alkali metal content, is combined with Hiroki for the Sennewald disclosure of iron addition to bismuth molybdate and to phospho-molybdate catalysts.

Sennewald characterized the improvements over prior catalysts to be based on the following differences "in the content of iron as an additional catalyst component and in the omission of such metals as tungsten, antimony and tin." Omission of antimony, as described by Sennewald, is inconsistent with the express object of Hiroki, to render the bismuth phospho-molybdate catalyst "more alkaline" by the addition of antimony and/or arsenic or its equivalent, the addition of alkali metal or alkaline earth metal.

The board's error, in rejecting claims over Hiroki and Sennewald, lies in its failure to recognize the express prohibition against inclusion of antimony in Sennewald's catalysts. In contrast, we have Hiroki's express statement as to interchangeability of alkali metal and antimony with the same beneficial result. Logical inquiry into the express statements of these two references would suggest lack of interchangeability of the respective catalytic components. Appellants' successful combination of alkali metal, iron, bismuth and molybdenum for a catalyst composition is contrary to these art descriptions.

Accordingly, we agree with the examiner's original conclusion and reverse the rejections under 35 U.S.C. §103 of claims 6–8, 11, 16–17, 19, 22–26, and 29–32 over Sennewald in combination with Hiroki.

B.

Rejections of Claims over Watanabe, Together with Other Evidence

In additional grounds of rejection, Watanabe was combined by the board with two other references, Yamaguchi, U.S. Patent No. 3,454,630, and Grasselli '631. Certain statements made by appellants with respect to Grasselli were treated as admissions, but these statements do not add information in addition to that of Grasselli '631 itself.

Turning to the substance of the rejections, the Watanabe catalyst systems discussed in section IV (composed of at least one oxide of tungsten, vanadium, molybdenum, uranium, copper, iron and chromium) differ significantly from those of Yamaguchi and Grasselli '631, each of which may require in combination, inter alia, iron, bismuth and molybdenum, and each of which differs from the other as to essential additional components. Specifically, Yamaguchi catalysts are oxides of iron, bismuth, phosphorus, molybdenum and nickel or cobalt or both nickel and cobalt, while Grasselli '631 embraces as one catalyst system an oxide system of iron, bismuth, molybdenum, and either nickel or a combination of iron and nickel optionally containing phosphorus, antimony, and tin.

Notwithstanding the Watanabe "suggestion" to use sodium or potassium as a promoter, which is the board's sole reason for reliance on Watanabe, we find no suggestion in Watanabe to look to the description embodied by Yamaguchi or Grasselli '631, or vice-versa, and we find no evidence suggesting interchangeability of Watanabe's catalyst compositions with those required by the other two references. Absent such suggestions, the description of Watanabe when viewed in terms of catalysts actually exemplified in the 22 examples, provides no reasonable basis for adding Watanabe's sodium or potassium to the combined oxides of iron, bismuth and molybdenum of Yamaguchi and Grasselli '631. In our view, the description of Watanabe, as a whole, would not provide the required reasonable expectation of successful addition of sodium or potassium to catalysts described in the two primary references. In re Clinton, 188 USPQ 365, 367 (CCPA 1976); In re Mercier, 515 F.2d 1161, 185 USPQ 774 (CCPA 1975).

C.

The Rejections Under Rule 196(b) and (d) of Claims 16, 17, 22, 24, 29 and 31

As noted in section II above, there are five different grounds of rejection of various groupings of these six claims. However, we find it necessary to discuss only McClellan taken with Grasselli '631, because of the descriptions of the catalysts or the references previously given.

To recapitulate, McClellan describes heat treatment (at 750° to 850°C) of bismuth molybdate, or bismuth phospho-molybdate, catalysts to render the crystalline structure amorphous, for use in oxydehydrogenations. McClellan, it was determined, suggests addition of iron to the basic catalyst. Moreover, it was determined that McClellan describes that those same catalysts will tolerate sodium or potassium ion impurities or contaminants to certain specified extents.

Grasselli '631 is directed to bismuth molybdate catalysts containing, in addition, the oxides of at least two transition metals, one of them being preferably iron, for use in oxydenydrogenations. Grasselli '631 is relied upon by the PTO for its description indicating that a portion of the bismuth in the base composition may be replaced by antimony, tin, copper, or arsenic. Grasselli '631 is silent with respect to the presence of alkali metal and describes a calcination temperature of above 500°F (about 262°C), which, according to Grasselli '631 Example 1, may be up to 800°F.

Appealed claim 16 requires the inclusion of antimony in appellants' catalyst containing potassium as the alkali metal. Moreover, appealed claim 16 embraces the inclusion of the second transition metal required by Grasselli '631. On the basis of the record before us, it is our view that a person of ordinary skill would have expected that inclusion of antimony, suggested by Grasselli '631, in the catalyst suggested by McClellan, would produce a composition operative as a catalyst, for example, in oxydehydrogenations.

Appealed claim 17 specifies potassium as the essential alkali metal and activation at 500°F (in air). Appellants argue that the temperature used by McClellan would destroy appellants' "activated catalytic oxide compound." In light of the description in both McClellan and Grasselli '631, more is necessary than appellants' argument with respect to the significance of appellants' temperature recitation. McClellan requires, as appellants point out, conversion of the crystalline composition to an amorphous form at 750-850°C. However, McClellan also indicates that heat treatment at a lower temperature can produce conventional catalysts, but in crystalline rather than the amorphous form which McClellan requires. The Grasselli '631 description concerning catalyst calcination temperatures is cumulative to McClellan's description concerning the effect of calcination temperature on the crystalline form of the composition. If appellants' catalysts, made at the temperature specified in claim 17, exhibit unobvious properties over that described by McClellan, there is no proof of that fact in this record.

Accordingly, we affirm the rejections of claims 16 and 17 over McClellan in view of Grasselli '631.

However, the rejections of claims 22, 24, 29, and 31 over McClellan and Grasselli '631 are reversed for reasons set forth above. These claims require the essential alkali metal component of appellants' catalyst composition to be cesium or rubidium. As discussed in section IV D, above, McClellan does not describe cesium or rubidium in catalyst compositions; and Grasselli, silent with respect to alkali metals, cannot change that determination.[16]

Accordingly, the rejections under 35 U.S.C. §103 of claims 15 and 19-32 are reversed, and rejections of claims 1-14, 16-18, 33 and 34 under 35 U.S.C. §103 are affirmed.

AFFIRMED IN PART AND REVERSED IN PART.

Court of Appeals, Federal Circuit

Kalman v. Kimberly-Clark Corporation

No. 83-540

Decided July 19, 1983

PATENTS

1. Court of Appeals for the Federal Circuit — Jursidiction (§26.55)

Federal Courts Improvement Act of 1982 Section 127(a), Pub. L. No. 97-164, 96 Stat. 25, gives CAFC exclusive jurisdiction of appeals from final decisions of federal district courts whose subject matter jurisdiction was based, in whole or in part, on 28 USC 1338(a), with exceptions.

2. Construction of specification and claims — Broad or narrow — In general (§22.101)

Construction of specification and claims — Comparison with other claims (§22.40)

Where some claims are broad and others narrow, narrow claim limitations cannot be read into broad whether to avoid invalidity or to escape infringement.

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[16] Similarly, neither the Japanese Patent (which describes potassium and sodium salts specifically,